#10

AF 267

Due Date: October 24, 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Brian D. Gantt et al.	Examiner:	L. Sealey
Serial No.:	09/186,270	Group Art Unit:	2671
Filed:	November 4, 1998	Docket:	G&C 30566.57-US-RE
Title:	METHOD AND APPARATUS FOR INTERACTIVELY MANIPULATING AND DISPLAYING PRESUMPTIVE RELATIONSHIPS BETWEEN GRAPHIC OBJECTS		

CERTIFICATE OF MAILING OR TRANSMISSION UNDER 37 CFR 1.8

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By: _____
Name: George H. Gates

Commissioner for Patents
Washington, D.C. 20231

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#11 Appeal Brief 1/10/02 NDA

Due Date: October 24, 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:	
Inventor: Brian D. Gantt et al.	Examiner: L. Sealey
Serial #: 09/186,270	Group Art Unit: 2671
Filed: November 4, 1998	Appeal No.: _____
Title: METHOD AND APPARATUS FOR INTERACTIVELY MANIPULATING AND DISPLAYING PRESUMPTIVE RELATIONSHIPS BETWEEN GRAPHIC OBJECTS	

BRIEF OF APPELLANTS

Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

In accordance with 37 CFR §1.192, Appellants hereby submit the Appellants' Brief on Appeal from the final rejection in the above-identified application, in triplicate, as set forth in the Office Action dated May 24, 2001.

Enclosed is our Credit Card Form PTO-2038 in the amount of $320.00 to cover the required fee for filing this Appeal Brief as set forth under 37 CFR §1.17(c). Also, please charge any additional fees or credit any overpayments to Deposit Account No. 50-0494 of Gates & Cooper LLP.

I. REAL PARTY IN INTEREST

The real party in interest is Autodesk, Inc., the assignee of the present application.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences for the above-referenced patent application.

III. STATUS OF CLAIMS

Claims 1-81 are pending in the application.

Claims 1, 4, 21, 25, 28, 45, 48-51, and 65-68 were rejected under 35 U.S.C. §102(e) as being anticipated by Venolia, U.S. Patent No. 5,463,722 (Venolia).

Claims 14-15 and 38-39 were rejected under 35 U.S.C. §103(a) as being obvious in view of the combination of Venolia, U.S. Patent No. 5,463,722 (Venolia) and Eckart, U.S. Patent No. 5,408,606 (Eckart).

Claim 24 was rejected under 35 U.S.C. §103(a) as being obvious in view of the combination of Venolia, U.S. Patent No. 5,463,722 (Venolia) and Rostoker, U.S. Patent No. 5,623,418 (Rostoker).

Claims 2-3, 5-13, 16-20, 22-34, 26-27, 29-44, 46-47, 52-64, and 69-81 were indicated as being allowable if rewritten in independent form to include the base claim and any intervening claims.

IV. STATUS OF AMENDMENTS

No amendments to the claims have been made subsequent to the final Office Action.

V. SUMMARY OF THE INVENTION

Independent claims 1, 21, 24-25, and 45 are generally directed to operating a computer aided design (CAD) system in presumptive mode. A selected graphic object is moved relative to a graphic pointing symbol, and the system determines when the selected graphic object is within a predetermined proximity of an underlying graphic object. The selected graphic object is then manipulated into a geometric relationship with the underlying graphic object according to predetermined geometric rules. This geometric relationship is dynamically updated based on movement of the graphic pointing symbol while the graphic pointing symbol remains within the predetermined proximity of the underlying graphic object.

Independent claims 48 and 65 are generally directed to a computer-aided design (CAD) system that displays a first graphic object on a computer and displays at least one point of interest on the computer when a pointing symbol is within a predetermined proximity of the first graphic object.

VI. ISSUES PRESENTED FOR REVIEW

1. Whether claims 1, 4, 21, 25, 28, 45, 48-51, and 65-68 are anticipated under 35 U.S.C. §102(e) by Venolia, U.S. Patent No. 5,463,722 (Venolia).

2. Whether claims 14-15 and 38-39 are obvious under 35 U.S.C. §103(a) in view of the combination of Venolia, U.S. Patent No. 5,463,722 (Venolia) and Eckart, U.S. Patent No. 5,408,606 (Eckart).

3. Whether claim 24 is obvious under 35 U.S.C. §103(a) in view of the combination of Venolia, U.S. Patent No. 5,463,722 (Venolia) and Rostoker, U.S. Patent No. 5,623,418 (Rostoker).

VII. GROUPING OF CLAIMS

The rejected claims do not stand or fall together. Each claim group is independently patentable. Separate arguments for the patentability of each claim group are provided below.

VIII. ARGUMENTS

A. Appellants' Independent Claims 1, 21, 24-25, And 45 Are Patentable Over The References

With regard to independent claims 1, 21, 24-25, and 45, the Appellants' invention is patentable over Venolia, Eckart, and Rostoker, because the cited references do not teach nor suggest the various elements of Appellants' claims. Specifically, the references do not teach or suggest the combination of claim limitations directed to moving a selected graphic object relative to a graphic pointing symbol, determining when a selected graphic object is within a predetermined proximity of an underlying graphic object, manipulating the selected graphic object into a geometric relationship with the underlying graphic object according to predetermined geometric rules, and then dynamically updating the geometric relationship based on movement of the graphic pointing symbol while the graphic pointing symbol remains within the predetermined proximity of the underlying graphic object.

For example, the Examiner asserts that the "dynamically updating" limitations of the Appellants' independent claims can be found in Venolia at col. 4, line 67 – col. 5, line 14. However, at the indicated location, Venolia merely states the following:

> "The present invention provides a method for aligning a displayed representation of an object comprising the steps of, displaying a representation of a first object in an initial position on a display screen under the control of a processor, displaying a representation of a second object on a display screen under the control of a processor, moving the representation of the first object toward the second object in a visually continuous manner using a cursor whose position is controlled by a cursor movement mechanism, calculating a current position for the first object which is displaced from a cursor dictated position by an amount which is determined as if the first object was under the gradual influence of an alignment field emanating from the second object, and displaying a representation of the first object on the display screen in the current position."

In contrast to Appellants' invention, Venolia merely describes an alignment field gradient which emanates from objects surrounding a manipulated object. The elements or steps of moving a selected graphic object relative to a graphic pointing symbol, determining when a selected graphic object is within a predetermined proximity of an underlying graphic object, manipulating the selected graphic object into a geometric relationship with the underlying graphic object according to predetermined geometric rules, and then dynamically updating the geometric relationship based on movement of the graphic pointing symbol while the graphic pointing symbol remains within the predetermined proximity of the underlying graphic object cannot be found in Venolia. Moreover, the relationship between the objects in Venolia is not based on the position of the pointing symbol relative to the underlying object, but instead is based on the proximity of the objects themselves.

Eckart fails to overcome the deficiencies of Venolia. Eckart was cited merely for teaching the limitations found in dependent claims 14-15 and 38-39 directed to partially deleting only selected ones of a plurality of graphics objects corresponding to the objects' respective clip regions. Consequently, the combination of Venolia and Eckart does not teach or suggest all the elements of Appellants' independent claims.

Rostoker also fails to overcome the deficiencies of Venolia. Rostoker was cited merely for teaching the limitations found in independent claim 24 directed to a database/file structure on a CAD system. Consequently, the combination of Venolia and Rostoker does not teach or suggest all the elements of Appellants' independent claims.

Moreover, the various elements of Appellants' claimed invention together provide operational advantages over Venolia, Eckart and Rostoker. In addition, Appellants' invention solves problems not recognized by Venolia, Eckart and Rostoker.

Thus, Appellants submit that independent claims 1, 21, 24-25, and 45 are allowable over Venolia.

B. Dependent Claims 4 And 28 Are Patentable Over The Prior Art

Dependent claims are submitted to be allowable over the Venolia reference in the same manner as independent claims 1 and 25, because they are dependent on independent claims 1 and 25, respectively, and thus contain all the limitations of these independent claims.

C. Dependent Claims 14-15 And 38-39 Are Patentable Over The Prior Art

Dependent claims 14-15 and 38-39 are submitted to be allowable over the Venolia and Eckart references in the same manner as independent claims 1 and 25, because they are dependent on independent claims 1 and 25, respectively, and thus contain all the limitations of the independent claims. In addition, dependent claims 14-15 and 38-39 recite additional novel elements not shown by the references.

With regard to claims 14 and 38, these claims recite that the selected graphic object includes a clip region, and the manipulating step or means further comprises the step of or means for partially deleting the underlying graphic object according to the clip region.

With regard to claims 15 and 39, these claims are dependent on claims 14 and 38 above, and recite that the underlying graphic object comprises a plurality of graphic objects, and the partially deleting step or means further comprises the step of or means for partially deleting only selected ones of the plurality of graphic objects corresponding to the clip region.

The Examiner acknowledges that Venolia does not disclose these elements, but asserts that Eckart does disclose these elements. However, Eckart merely describes how data that lies outside a viewport can be clipped, but not that the manipulation of a selected graphic object into a geometric relationship with an underlying graphic object according to predetermined geometric rules performs such an operation.

Thus, these claims are submitted to patentable over the references.

D. Appellants' Independent Claims 48 And 65 Are Patentable Over The References

With regard to independent claims 48 and 65, the Appellants' invention is patentable over Venolia, because the cited reference does not teach nor suggest the various elements of Appellants' claims. Specifically, the reference does not teach or suggest the claim limitations directed to displaying a first graphic object on a computer, and then displaying at least one point of interest on the computer when a pointing symbol is within a predetermined proximity of the first graphic object.

In contrast to Appellants' invention, Venolia does not identify "points of interest" on an object when a pointing symbol is within a predetermined proximity of the first graphic object. Instead, the entire object is considered to be "magnetic," rather than any specific points of interest on the object. Moreover, the magnetic relationship is between two objects, not between a pointing symbol and an object. Finally, Venolia does nothing to identify points of interest, or even magnetic objects themselves, since all objects are considered to be magnetic.

The various elements of Appellants' claimed invention recited in claims 48 and 65 together provide operational advantages over Venolia. In addition, Appellants' invention as recited in claims 48 and 65 solves problems not recognized by Venolia.

Thus, Appellants submit that independent claims 48 and 65 are allowable over the reference.

E. Dependent Claims 49-51 and 66-68 Are Patentable Over The Prior Art

Dependent claims 49-51 and 66-68 are also submitted to be allowable over Venolia in the same manner as independent claims 48 and 65, because they are dependent on independent claims 48 and 65, respectively, and thus contain all the limitations of the independent claims.

IX. CONCLUSION

In light of the above arguments, Appellants respectfully submit that the cited references do not anticipate nor render obvious the claimed invention. More specifically, Appellants' claims recite novel physical features which patentably distinguish over any and all references under 35 U.S.C. §§

102 and 103. As a result, a decision by the Board of Patent Appeals and Interferences reversing the Examiner and directing allowance of the pending claims in the subject application is respectfully solicited.

Respectfully submitted,

Brian D. Gantt et al.

By their attorneys,

GATES & COOPER LLP

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(310) 641-8797

Date: October 24, 2001

By: _____
Name: George H. Gates
Reg. No.: 33,500

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G&C 30566.57-US-RE

CERTIFICATE OF MAILING OR TRANSMISSION UNDER 37 CFR 1.8

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Oct. 24, 2001

By: _____
Name:

APPENDIX

1. A method of operating a computer aided design system in presumptive mode, comprising the steps of:

moving a selected graphic object relative to a graphic pointing symbol;

determining when the selected graphic object is within a predetermined proximity of an underlying graphic object;

manipulating the selected graphic object into a geometric relationship with the underlying graphic object according to predetermined geometric rules; and

dynamically updating the geometric relationship based on movement of the graphic pointing symbol while the graphic pointing symbol remains within the predetermined proximity of the underlying graphic object.

2. The method of claim 1, wherein the predetermined proximity is a location tolerance before said manipulating step and converts to a larger rejection tolerance during said dynamically updating step.

3. The method of claim 1, wherein said manipulating step comprises the step of:

orientating the selected graphic object according to a tangential angle with respect to the underlying graphic object at a cling point.

4. The method of claim 1, wherein said manipulating step includes the step of:

positioning the selected graphic object at a predetermined offset relative to the underlying graphic object.

5. The method of claim 4, wherein the underlying graphic object has two sides, during said dynamically updating step, further comprising the step of:

moving the selected graphic object to the opposite side of the underlying graphic object when the graphic pointing symbol is moved to the opposite side.

6. The method of claim 5, wherein said dynamically updating step further comprises the step of:

mirroring the selected graphic object about the underlying graphic object when moved to the opposite side of the underlying graphic object.

7. The method of claim 6, wherein said dynamically updating step further comprises the step of:

mirroring the selected graphic object about a perpendicular offset line when moved to the opposite side of the underlying graphic object.

8. The method of claim 5, wherein said dynamically updating step further comprises the step of:

mirroring the selected graphic object about a perpendicular offset line when moved to the opposite side of the underlying graphic object.

9. The method of claim 1, after said manipulating step, further comprising the step of:

modifying the underlying graphic object according to the predetermined geometric rules.

10. The method of claim 9, wherein said modifying step comprises the step of:

dividing the underlying graphic object into two separate underlying graphic objects for inserting the selected graphic object therebetween.

11. The method of claim 10, wherein said modifying step further comprises the step of:

deleting a portion of the original underlying graphic object for inserting the selected graphic object.

12. The method of claim 1, wherein the selected graphic object includes at least one alignment vector, said manipulating step further comprising the step of:

aligning the selected graphic object with the underlying graphic object according to the alignment vector.

13. The method of claim 1, wherein the selected graphic object and the underlying graphic object each have an alignment vector, wherein said manipulating step comprises the step of:

aligning the selected graphic object with the underlying graphic object by aligning the alignment vectors.

14. The method of claim 1, wherein the selected graphic object includes a clip region, said manipulating step further comprising the step of:

partially deleting the underlying graphic object according to the clip region.

15. The method of claim 14, wherein the underlying graphic object comprises a plurality of graphic objects, said partially deleting step further comprising the step of:

partially deleting only selected ones of the plurality of graphic objects corresponding to the clip region.

16. The method of claim 1, wherein said dynamically updating step further comprises the steps of:

clinging the selected graphic object to an initial cling point; and

rotating the selected graphic object about the initial cling point corresponding to movement of the graphic pointing symbol.

17. The method of claim 1, further comprising the step of:

unclinging the selected graphic object from the underlying graphic object to move with the graphic pointing symbol when the graphic pointing symbol is moved a greater distance than the predetermined proximity from the underlying graphic object.

18. The method of claim 1, wherein said dynamically updating step includes the step of:

moving the selected graphic object relative to a sliding cling point along the underlying graphic object where the cling point moves relative to the graphic pointing symbol as the graphic pointing symbol is moved within the predetermined proximity of the underlying graphic object.

19. The method of claim 18, wherein said dynamically updating step further comprises the step of:

interactively modifying the underlying graphic object according to the predetermined rules and relative to the sliding cling point as the graphic pointing symbol is moved.

20. The method of claim 18, wherein the underlying graphic object includes a primary vector and a secondary vector, the selected graphic object having a first alignment vector and a second alignment vector, wherein said manipulating and dynamically updating steps further comprise the steps of:

aligning the selected graphic object with the primary vector according to the first alignment vector when the first alignment vector is within a predetermined proximity of the primary vector; and

aligning the selected graphic object with the secondary vector according to the second alignment vector when the second alignment vector is within a predetermined proximity of the secondary vector.

21. A method of operating a computer aided design system, comprising the steps of:

providing at least one graphic object to be selected for insertion into a graphic design;

displaying and moving a selected graphic object with a graphic cursor moved within the graphic design;

when the selected graphic object is within a predetermined proximity with respect to one or more underlying graphic objects, automatically manipulating the object into a geometric relationship with the underlying graphic object; and

dynamically updating the geometric relationship based on movement of the graphic cursor while the graphic cursor remains within the predetermined proximity of the underlying graphic object.

22. The method of claim 21, wherein said manipulating step comprises the steps of:

orienting the selected graphic object relative to a cling point along the underlying graphic object; and

positioning the selected graphic object at a predetermined offset relative to the cling point.

23. The method of claim 22, further comprising the step of:

continually re-orienting and re-positioning the selected graphic object relative to a sliding cling point which moves relative to the graphic cursor as it is moved within the predetermined proximity.

24. A presumptive mode computer aided design system for interactively manipulating and displaying a selected object according to predefined geometric relationships, comprising:

a display device for displaying a graphic environment;

memory for storing data, including:

a data base defining geometric relationships among graphic objects;

a plurality of graphic object files, each defining a corresponding graphic object and associated symbol for display in said graphic environment; and

a design file for incorporating a plurality of underlying graphic objects according to said geometric relationships;

a pointing device for receiving input from an operator; and

a processor coupled to said memory, said display device and said pointing device for controlling said graphic environment;

wherein the operator selects an object for insertion into said design file and manipulates a graphic cursor in proximity with one of said underlying graphic objects displayed in said graphic environment, wherein said processor moves said selected object with said graphic cursor and then manipulates said graphic object and said design file in to a geometric relationship when said selected object is within proximity with said one of said underlying graphic objects, and wherein said processor dynamically updates said geometric relationship based on movement of said graphic cursor while said graphic cursor is within proximity of said underlying graphic objects.

25. A computer aided design system, comprising:

a computer;

means, performed by the computer, for moving a selected graphic object relative to a graphic pointing symbol, for determining when the selected graphic object is within a predetermined proximity of an underlying graphic object, for manipulating the selected graphic object into a geometric relationship with the underlying graphic object according to predetermined geometric rules, and for dynamically updating the geometric relationship based on movement of the graphic pointing symbol while the graphic pointing symbol remains within the predetermined proximity of the underlying graphic object.

26. The system of claim 25, wherein the predetermined proximity is a location tolerance before said means for manipulating and converts to a larger rejection tolerance during said means for dynamically updating.

27. The system of claim 25, wherein said means for manipulating comprises:

means for orientating the selected graphic object according to a tangential angle with respect to the underlying graphic object at a cling point.

28. The system of claim 25, wherein said means for manipulating includes:

means for positioning the selected graphic object at a predetermined offset relative to the underlying graphic object.

29. The system of claim 28, wherein the underlying graphic object has two sides, during said means for dynamically updating, further comprising:

means for moving the selected graphic object to the opposite side of the underlying graphic object when the graphic pointing symbol is moved to the opposite side.

30. The system of claim 29, wherein said means for dynamically updating further comprises:

means for mirroring the selected graphic object about the underlying graphic object when moved to the opposite side of the underlying graphic object.

31. The system of claim 30, wherein said means for dynamically updating further comprises:

means for mirroring the selected graphic object about a perpendicular offset line when moved to the opposite side of the underlying graphic object.

32. The system of claim 29, wherein said means for dynamically updating further comprises:

means for mirroring the selected graphic object about a perpendicular offset line when moved to the opposite side of the underlying graphic object.

33. The system of claim 25, after said means for manipulating, further comprising:

means for modifying the underlying graphic object according to the predetermined geometric rules.

34. The system of claim 33, wherein said means for modifying comprises:

means for dividing the underlying graphic object into two separate underlying graphic objects for inserting the selected graphic object therebetween.

35. The system of claim 34, wherein said means for modifying further comprises:

means for deleting a portion of the original underlying graphic object for inserting the selected graphic object.

36. The system of claim 25, wherein the selected graphic object includes at least one alignment vector, said means for manipulating further comprising:

means for aligning the selected graphic object with the underlying graphic object according to the alignment vector.

37. The system of claim 25, wherein the selected graphic object and the underlying graphic object each have an alignment vector, wherein said means for manipulating comprises:

means for aligning the selected graphic object with the underlying graphic object by aligning the alignment vectors.

38. The system of claim 25, wherein the selected graphic object includes a clip region, said means for manipulating further comprising:

means for partially deleting the underlying graphic object according to the clip region.

39. The system of claim 38, wherein the underlying graphic object comprises a plurality of graphic objects, said means for partially deleting further comprising:

means for partially deleting only selected ones of the plurality of graphic objects corresponding to the clip region.

40. The system of claim 25, wherein said means for dynamically updating further comprises:

means for clinging the selected graphic object to an initial cling point; and

means for rotating the selected graphic object about the initial cling point corresponding to movement of the graphic pointing symbol.

41. The system of claim 25, further comprising:

means for unclinging the selected graphic object from the underlying graphic object to move with the graphic pointing symbol when the graphic pointing symbol is moved a greater distance than the predetermined proximity from the underlying graphic object.

42. The system of claim 25, wherein said means for dynamically updating includes:

means for moving the selected graphic object relative to a sliding cling point along the underlying graphic object where the cling point moves relative to the graphic pointing symbol as the graphic pointing symbol is moved within the predetermined proximity of the underlying graphic object.

43. The system of claim 42, wherein said means for dynamically updating further comprises:

means for interactively modifying the underlying graphic object according to the predetermined rules and relative to the sliding cling point as the graphic pointing symbol is moved.

44. The system of claim 25, wherein the underlying graphic object includes a primary vector and a secondary vector, the selected graphic object having a first alignment vector and a second alignment vector, wherein said means for manipulating and means for dynamically updating further comprise:

means for aligning the selected graphic object with the primary vector according to the first alignment vector when the first alignment vector is within a predetermined proximity of the primary vector; and

means for aligning the selected graphic object with the secondary vector according to the second alignment vector when the second alignment vector is within a predetermined proximity of the secondary vector.

45. A computer aided design system, comprising:

a computer;

means, performed by the computer, for providing at least one graphic object to be selected for insertion into a graphic design and for displaying and moving a selected graphic object with a graphic cursor moved within the graphic design;

means, performed by the computer, for automatically manipulating the object into a geometric relationship with the underlying graphic object when the selected graphic object is within a predetermined proximity with respect to one or more underlying graphic objects; and

means, performed by the computer, for dynamically updating the geometric relationship based on movement of the graphic cursor while the graphic cursor remains within the predetermined proximity of the underlying graphic object.

46. The system of claim 45, wherein said means for manipulating comprises:

means for orienting the selected graphic object relative to a cling point along the underlying graphic object; and

means for positioning the selected graphic object at a predetermined offset relative to the cling point.

47. The system of claim 46, further comprising:

means for continually re-orienting and re-positioning the selected graphic object relative to a sliding cling point which moves relative to the graphic cursor as it is moved within the predetermined proximity.

48. A method of operating a computer-aided design system, comprising:

(a) displaying a first graphic object on a computer; and

(b) displaying at least one point of interest on the computer when a pointing symbol is within a predetermined proximity of the first graphic object.

49. The method of claim 48, wherein a position of the pointing symbol is controlled by an input device coupled to the computer.

50. The method of claim 48, wherein the points of interest are identified by predefined rules.

51. The method of claim 50, wherein the predefined rules limit selection of the first graphic object.

52. The method of claim 50, wherein the predefined rules perform one or more geometric computations selected from a group comprising tangent, offset, parallel, alignment, end point, major vector, divided segment, extended segment, and intersection computations.

53. The method of claim 48, further comprising displaying a second graphic object and joining the first and second graphic objects when the pointing symbol is moved to within a predetermined location tolerance of the first graphic object.

54. The method of claim 53, wherein the predetermined location tolerance identifies a minimum perpendicular distance which determines when the second graphic object is close enough to the first graphic object to establish an association therebetween.

55. The method of claim 53, wherein the second graphic object is joined to the first graphic object when a designated origin point of the second graphic object moves to within the predetermined location tolerance with respect to the first graphic object.

56. The method of claim 53, further comprising separating the first and second graphic objects when the pointing symbol is moved to beyond a predetermined rejection tolerance of the first graphic object.

57. The method of claim 53, wherein the joining step comprises joining the first and second graphic objects at one or more of the points of interest.

58. The method of claim 53, wherein the first and second graphic objects are joined according to one or more characteristics selected from a group comprising a predefined offset, orientation, and rotation.

59. The method of claim 53, further comprising dynamically updating a relationship between the first and second graphic as the pointing symbol is moved.

60. The method of claim 59, wherein the dynamically updating step comprises repositioning the second graphic object relative to the first graphic object as the pointing symbol is moved.

61. The method of claim 48, wherein the points of interest are cling points.

62. The method of claim 48, further comprising displaying a second graphic object and clinging the second graphic object to the first graphic object according to at least one predefined cling characteristic.

63. The method of claim 62, wherein the cling characteristic comprises at least one characteristic selected from a group comprising:

joining the second graphic object to the first graphic object via a shortest distance where the origin of the second graphic object aligns and is coincident with a closest point of interest on the first graphic object,

sliding the second graphic object in alignment with the first graphic object as the pointing symbol is moved,

rotating the second graphic object about at least one of the points of interest on the first graphic object by manipulating the pointing symbol around the point,

positioning the second graphic object at an opposite side of the first graphic object when the pointing symbol traverses from one side to another of the first graphic object, and

positioning the second graphic object at a 180-degree rotation of the first graphic object at a specified perpendicular offset in a direction of the pointing symbol.

64. The method of claim 63, further comprising unclinging the second graphic object from the first graphic object as the pointing symbol is moved a distance greater than a predetermined rejection tolerance away from the first graphic object.

65. A computer-aided design system, comprising:

(a) a computer; and

(b) means, performed by the computer, for displaying a first graphic object on a computer and for displaying at least one point of interest on the computer when a pointing symbol is within a predetermined proximity of the first graphic object.

66. The method of claim 65, wherein a position of the pointing symbol is controlled by an input device coupled to the computer.

67. The method of claim 65, wherein the points of interest are identified by predefined rules.

68. The method of claim 67, wherein the predefined rules limit selection of the first graphic object.

69. The method of claim 67, wherein the predefined rules perform one or more geometric computations selected from a group comprising tangent, offset, parallel, alignment, end point, major vector, divided segment, extended segment, and intersection computations.

70. The method of claim 65, further comprising displaying a second graphic object and joining the first and second graphic objects when the pointing symbol is moved to within a predetermined location tolerance of the first graphic object.

71. The method of claim 70, wherein the predetermined location tolerance identifies a minimum perpendicular distance which determines when the second graphic object is close enough to the first graphic object to establish an association therebetween.

72. The method of claim 70, wherein the second graphic object is joined to the first graphic object when a designated origin point of the second graphic object moves to within the predetermined location tolerance with respect to the first graphic object.

73. The method of claim 70, further comprising separating the first and second graphic objects when the pointing symbol is moved to beyond a predetermined rejection tolerance of the first graphic object.

74. The method of claim 70, wherein the joining step comprises joining the first and second graphic objects at one or more of the points of interest.

75. The method of claim 70, wherein the first and second graphic objects are joined according to one or more characteristics selected from a group comprising a predefined offset, orientation, and rotation.

76. The method of claim 70, further comprising dynamically updating a relationship between the first and second graphic as the pointing symbol is moved.

77. The method of claim 76, wherein the dynamically updating step comprises repositioning the second graphic object relative to the first graphic object as the pointing symbol is moved.

78. The method of claim 65, wherein the points of interest are cling points.

79. The method of claim 65, further comprising displaying a second graphic object and clinging the second graphic object to the first graphic object according to at least one predefined cling characteristic.

80. The method of claim 79, wherein the cling characteristic comprises at least one characteristic selected from a group comprising:

joining the second graphic object to the first graphic object via a shortest distance where the origin of the second graphic object aligns and is coincident with a closest point of interest on the first graphic object,

sliding the second graphic object in alignment with the first graphic object as the pointing symbol is moved,

rotating the second graphic object about at least one of the points of interest on the first graphic object by manipulating the pointing symbol around the point,

positioning the second graphic object at an opposite side of the first graphic object when the pointing symbol traverses from one side to another of the first graphic object, and

positioning the second graphic object at a 180-degree rotation of the first graphic object at a specified perpendicular offset in a direction of the pointing symbol.

81. The method of claim 79, further comprising unclinging the second graphic object from the first graphic object as the pointing symbol is moved a distance greater than a predetermined rejection tolerance away from the first graphic object.